

PATENT ABSTRACTS OF JAPAN

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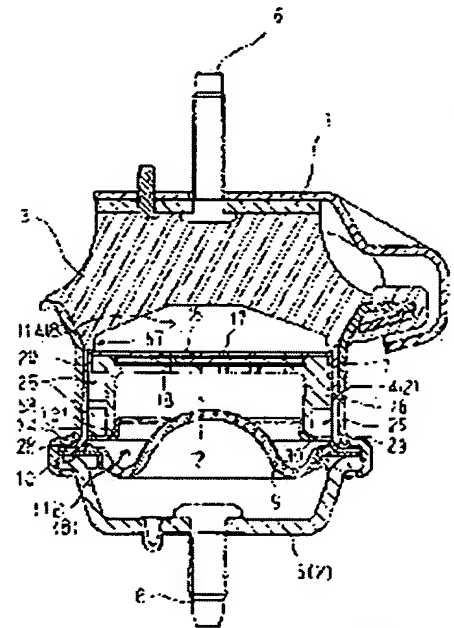
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(30)Priority

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(54) LIQUID SEALING TYPE VIBRATION DAMPER

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a liquid sealing type vibration damper which can sufficiently reduce noise.**SOLUTION:** The liquid sealing type vibration damper comprises a first mounting element 1, a second mounting element 2, a vibration damping base element 3, a diaphragm 9, a partition element 12, and an orifice 25. The partition element 12 is composed of an elastic partition membrane 15, and a pair of grid members 17, 18. The elastic partition membrane 15 has a group of ribs 50 projecting from both surfaces thereof. The group of the ribs 50 is composed of a plurality of first ribs 51 and a plurality of second ribs 52, which are mixedly located. The height of the first ribs 51 is set such that the top of the first ribs 51 can be located so as to separate from the grid members 17, 18. The height of the second ribs 52 is set such that the top of the second ribs 52 can be located so as to come into contact with the grid members 17, 18. Further, the width of the second ribs 52 is set so as to be smaller than that of the first ribs 51.

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CLAIMS

[Claim(s)]

[Claim 1]

It has the 1st fixture, the 2nd tubed fixture, the vibrationproofing base that consists of the rubber-like elasticity material which connects these, the diaphragm which is attached in said 2nd fixture and forms a liquid enclosure room between said vibrationproofing bases, the partition object which divides said liquid enclosure room into the 1st liquid room by the side of said vibrationproofing base, and the 2nd liquid room by the side of said diaphragm, and the orifice which makes said 1st liquid room and 2nd liquid room open for free passage. Said partition object is a liquid seal close type vibration isolator which consists of the elastic partition film and the grid member of the pair which regulates the amount of displacement of said elastic partition film from the both sides.

A rib group protrudes on both sides of said elastic partition film, respectively, and this rib group consists of two or more 1st ribs intermingled mutually and two or more 2nd ribs,

Said 1st rib has a height dimension set up so that the crowning may separate with said grid member and can be located.

Said 2nd rib is a liquid seal close type vibration isolator with which a height dimension is set up, and rib width of face is set up so that it may become smaller than said 1st rib so that the crowning may contact said grid member.

[Claim 2]

It is the liquid seal close type vibration isolator according to claim 1 with which said 1st rib is arranged possible [enclosure of these grids hole] for every grid hole of a predetermined number in the field of said elastic partition film, and said 2nd rib is distributed by the field of said elastic partition film.

[Claim 3]

Two or more trains arrangement of said grid hole is carried out in the hoop direction of said grid member.

Said two or more 1st ribs are formed annularly, and are constituted from a direction of a path of said grid member by the grid member part of the both sides of each grid hole line possible [the contact to each **],

Said two or more 2nd ribs are liquid seal close type vibration isolators according to claim 2 arranged to the axis of said elastic partition film at the radial.

[Claim 4]

Said 1st rib and 2nd rib are a liquid seal close type vibration isolator according to claim 1 arranged possible [enclosure of these grids hole] for every grid hole of a predetermined number in the field of said elastic partition film.

[Claim 5]

The liquid seal close type vibration isolator of any one publication of claim 1-4 with which a stirring plate is formed in said 1st liquid interior of a room, and the 1st liquid room side orifice is formed between the periphery edge of said stirring plate, and the inner skin of a vibrationproofing base.

[Claim 6]

The liquid seal close type vibration isolator according to claim 5 with which support connection of the connection section of the central site of said stirring plate is carried out at the end section of the support shaft which penetrates said vibrationproofing base and is connected with said 1st fixture.

[Claim 7]

It is the liquid seal close type vibration isolator according to claim 6 with which said vibrationproofing base is carrying out vulcanization adhesion at said support shaft, and caulking immobilization of the connection section of the central site of said stirring plate is carried out at the end section of said support shaft.

[Claim 8]

The inner skin of the vibrationproofing base which forms the interior wall of said 1st liquid room So that the further side from said partition object may stand in a row in the overall diameter section of the taper side of a minor diameter, and this taper side, a path may consist of the field of the shape of the fixed body and said 1st liquid room side orifice may be formed between parts for the taper surface part near [said] the overall diameter section The liquid seal close type vibration isolator of any one publication of claim 5-7 with which the magnitude and the location of said stirring plate are set up.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[Field of the Invention]

[0001]

The vibrationproofing base which consists of the rubber-like elasticity material by which, as for this invention, these are connected with the 1st fixture and the 2nd tubed fixture, It has the diaphragm which is attached in said 2nd fixture and forms a liquid enclosure room between said vibrationproofing bases, the partition object which divides said liquid enclosure room into the 1st liquid room by the side of said vibrationproofing base, and the 2nd liquid room by the side of said diaphragm, and the orifice which makes said 1st liquid room and 2nd liquid room open for free passage,

Said partition object is related with the liquid seal close type vibration isolator which consists of the elastic partition film and the grid member of the pair which regulates the amount of displacement of said elastic partition film from the both sides.

[Background of the Invention]

[0002]

It prepares between the engine of an automobile, and a car-body frame, and the above-mentioned liquid seal close type vibration isolator is *****. And if it originates in the irregularity of a transit road surface and vibration of the large amplitude arises, a liquid will flow between both the liquid room through an orifice, and vibration will be attenuated according to the liquid flow effectiveness. On the other hand, if vibration of tiny vibration width of face arises, a liquid will not circulate, the elastic partition film will carry out reciprocation deformation of between both the liquid room, and vibration will be attenuated.

[0003]

In this kind of liquid seal close type vibration isolator, when the elastic partition film collides with a grid member, it is easy to generate an allophone. Then, the rib of a radial was prepared in the grid member as conventionally indicated by the patent reference 1. Moreover, with a grid member, the elastic partition film can separate and it can be located now (refer to drawing 4 of the patent reference 1).

[Patent reference 1] JP,6-221368,A

[Description of the Invention]

[Problem(s) to be Solved by the Invention]

[0004]

According to the above-mentioned conventional configuration, the collision sound at the time of the elastic partition film of what can reduce an allophone to some extent colliding with the rib of a grid member could not be avoided, and the allophone was not able to be reduced enough.

[0005]

The purpose of this invention is in the point of offering the liquid seal close type vibration isolator which can fully reduce an allophone.

[Means for Solving the Problem]

[0006]

In the liquid seal close type vibration isolator indicated at the beginning, as for the description of this invention, a rib group protrudes on both sides of said elastic partition film, respectively, and this rib group consists of two or more 1st ribs intermingled mutually and two or more 2nd ribs,

Said 1st rib has a height dimension set up so that the crowning may separate with said grid member and can be located.

Said 2nd rib is in the point that a height dimension is set up, and rib width of face is set up so that it may become smaller than said 1st rib so that the crowning may contact said grid member.

[0007]

[A] According to the above-mentioned configuration, two or more 1st ribs can make the crowning able to estrange from a grid member, and it can change into the condition that two or more 2nd ribs are making the crowning contact a grid member at which field (one film surface and film surface of another side) side of the elastic partition film. By this, when the elastic partition film goes to a grid member side with vibration, the 2nd rib can be resisting, and the crowning of the 1st rib can be made to collide with a grid member side gently. It is avoidable that the drag force of two or more 2nd ribs concentrates them on some elastic partition film since the 1st rib and the 2nd rib are made intermingled. Moreover, since the 2nd rib is made smaller than the 1st rib and rigidity is weakened, it is avoidable that the elastic partition film stops being able to reciprocate easily.

[0008]

In this invention, said 1st rib is arranged possible [enclosure of these grids hole] for every grid hole of a predetermined number in the field of said elastic partition film, and if said 2nd rib is distributed by the field of said elastic partition film, it can do the next operation so.

[0009]

[B] It is avoidable that the drag force of two or more 2nd ribs concentrates it on some elastic partition film since the 2nd rib is distributed by the field of a grid member. And in the vibrational state of the large amplitude, since the 1st rib encloses them for every grid hole of a predetermined number when the crowning of the 1st rib contacts a grid member, the grid hole of said predetermined number and these can avoid that a liquid flows between another grid holes, and can prevent the fall of vibration-proof ability.

[0010]

In this invention, two or more trains arrangement of said grid hole is carried out in the hoop direction of said grid member,

Said two or more 1st ribs are formed annularly, and are constituted from a direction of a path of said grid member by the grid member part of the both sides of each grid hole line possible [the contact to each **],

If said two or more 2nd ribs are arranged to the axis of said elastic partition film at the radial, they can do the next operation so.

[0011]

[C] That is, in the vibrational state of the large amplitude, when the crowning of the 1st rib contacts a grid member, two or more 1st ribs enclose those grid holes for every grid hole line, and the grid hole of the grid hole line of arbitration and this — ***** — it can prevent that a liquid flows between the grid holes of another grid hole line. It is avoidable that the drag force of two or more 2nd ribs concentrates

it on some elastic partition film since the 2nd rib is arranged to the axis of the elastic partition film at the radial.

[0012]

In this invention said 1st rib and 2nd rib If it is arranged possible [enclosure of these grids hole] for every grid hole of a predetermined number in the field of said elastic partition film, it will set to the vibrational state of the large amplitude. Since the 1st rib and the 2nd rib enclose these grids hole for every grid hole of a predetermined number when the crowning of the 1st rib contacts a grid member, the grid hole of a predetermined number and these can avoid that a liquid flows between another grid holes, and can prevent the fall of vibration-proof ability.

[0013]

By the way, when vibration of high frequency inputs into this equipment, reciprocation deformation is carried out, and thereby, said elastic partition film absorbs the internal pressure of the 1st liquid room, and controls high dynamic spring-ization of this equipment. However, if vibration of a higher frequency region inputs, it is possible that displacement resistance of the elastic partition film increases and low dynamic spring-ization becomes inadequate. Then, in this invention, if a stirring plate is formed in said 1st liquid interior of a room and the 1st liquid room side orifice is formed between the periphery edge of said stirring plate, and the inner skin of a vibrationproofing base, the liquid which circulates the 1st liquid room side orifice can be resonated in a high-frequency region (the resonance frequency of said liquid is set as a high value), and low dynamic spring-ization of this equipment in a high-frequency region can be attained.

[0014]

In this invention, the connection section of the central site of said stirring plate can make it the configuration by which support connection is carried out at the end section of the support shaft which penetrates said vibrationproofing base and is connected with said 1st fixture.

[0015]

Said vibrationproofing base is carrying out vulcanization adhesion at said support shaft, and with the configuration by which caulking immobilization is carried out at the end section of said support shaft, the connection section of the central site of said stirring plate can control the increment in components mark, and can simplify structure.

[0016]

Moreover, the inner skin of the vibrationproofing base which forms the interior wall of said 1st liquid room So that the further side from said partition object may stand in a row in the overall diameter section of the taper side of a minor diameter, and this taper side, a path may consist of the field of the shape of the fixed body and said 1st liquid room side orifice may be formed between parts for the taper surface part near [said] the overall diameter section It can be made the configuration to which the magnitude and the location of said stirring plate are set.

[Effect of the Invention]

[0017]

According to this invention, the crowning of the 1st rib could be made to have been able to collide with a grid member side gently, and the liquid seal close type vibration isolator which can fully reduce an allophone was able to be offered.

[0018]

Said 1st rib is arranged possible [enclosure of these grids hole] for every grid hole of a predetermined number in the field of said elastic partition film. And said 2nd rib [whether it is distributed by the field of said elastic partition film, and] Or if said 1st rib and 2nd rib are arranged possible [enclosure of these grids hole] for every grid hole of a predetermined number in the field of said elastic partition film, it will set to the vibrational state of the large amplitude. When the crowning of the 1st rib contacted a grid member, the grid hole of a predetermined number and these could prevent that a liquid flowed between another grid holes, and were able to offer the liquid seal close type vibration isolator which can raise vibration-proof ability more.

[0019]

Moreover, if a stirring plate is formed in said 1st liquid interior of a room and the 1st liquid room side orifice is formed between the periphery edge of said stirring plate, and the inner skin of a vibrationproofing base, in addition to the above-mentioned effectiveness, the liquid seal close type vibration isolator which can absorb enough vibration of the large range ranging from the low frequency to high frequency can be offered.

[Best Mode of Carrying Out the Invention]

[0020]

[The 1st operation gestalt]

Hereafter, the gestalt of operation of this invention is explained based on a drawing. The liquid seal close type vibration isolator is shown in drawing 1. This vibration isolator is equipped with the 1st fixing metal 1 attached in the engine of an automobile, the 2nd tubed fixing metal 2 attached in the car-body frame of an engine lower part, and the vibrationproofing base 3 which consists of the rubber-like elasticity material which connects these.

[0021]

The 1st fixing metal 1 was formed in tabular, and is equipped with the upward anchoring bolt 6. The 2nd fixing metal 2 consists of the tubed metallic ornaments 4 by which vulcanization shaping of the vibrationproofing base 3 is carried out, and the cup-like bottom metallic ornaments 5, and the downward anchoring bolt 6 protrudes on the center section of the bottom metallic ornaments 5.

[0022]

The vibrationproofing base 3 is formed in the truncated-cone configuration. And the upper limit side carries out at the 1st fixing metal 1, and the lower limit section is carrying out vulcanization adhesion at tubed metallic-ornaments 4 top breadth-like upper limit opening, respectively. The centrum which narrows a top is formed in the inferior-surface-of-tongue section of this vibrationproofing base 3, and the wrap rubber membrane 7 stands the inner skin of the tubed metallic ornaments 4 in a row in the lower limit section of the vibrationproofing base 3.

[0023]

The diaphragm 9 of the shape of a partial ball which consists of the rubber membrane which forms the liquid enclosure room 8 between the inferior surfaces of tongue of the vibrationproofing base 3 is attached in the 2nd fixing metal 2, and the liquid is enclosed with it by the liquid enclosure room 8. Diaphragm 9 is covered with the bottom metallic ornaments 5.

[0024]

As shown also in drawing 10 and drawing 11, the partition object 12 which divides the liquid enclosure room 8 into 1st liquid room 11A by the side of the vibrationproofing base 3 and 2nd liquid room 11B by the side of diaphragm is established. Pinching immobilization of the partition object 12 is carried out with the pinching member 14 and the vibrationproofing base 3 which were prepared in the inner circumference section side of the 2nd fixing metal 2.

[0025]

opening by the side of the end section of the cylinder part material 16 which the partition object 12 holds the disc-like elastic partition film 15 which consists of rubber membrane, and this elastic partition film 15, and is caught in detail with the grid wall 18 (equivalent to a grid member) between inner skin, and this cylinder part material 16 — the wrap grid disc-like partition film — a variation rate — it consists of the specification-part material 17 (equivalent to a grid member). that is, the grid wall 18 — dividing — the film — a variation rate — the specification-part material 17 — the variation rate of the elastic partition film 15 — the amount is regulated from the both sides of the film

15.

[0026]

The orifice 25 which makes said 1st liquid room 11A and 2nd liquid room 11B open for free passage is formed between the peripheral face of the cylinder part material 16, and the inner skin of the 2nd fixing metal 2. As shown in drawing 2, drawing 3, and drawing 4, orifice passage is made into the circumference of the axis O of the cylinder part material 16 2 round. That is, it consists of the upper orifice passage R1 for 1 round, and the lower orifice passage R2 for 1 round. 22 is an orifice formation wall, the upper orifice passage R1 — the partition film — a variation rate — it is open for free passage through opening 19 (refer to drawing 5) and the notch 55 of the specification-part material 17. The lower orifice passage R2 is open for free passage with 2nd liquid room 11B through the opening 58 of the pinching member 14 (refer to drawing 1).

[0027]

As shown in drawing 1, the pinching member 14 changes from the pars intermedia side monotonous section 30 which carries out a press operation, and the 2nd cylinder part 31 which inner-** to opening by the side of the other end 24 of the cylinder part material 16 to the periphery section side monotonous section 28, the 1st cylinder part 29 which inner-** in the lower limit section of rubber membrane 7, and the other end of the cylinder part material 16. Caulking immobilization of the periphery section side monotonous section 28 is carried out with adapter plate 10, tubed metallic-ornaments 4, and the bottom metallic ornaments 5 of diaphragm 9.

[0028]

it is shown in drawing 5 and drawing 6 — as — the partition film — a variation rate — the specification-part material 17 equips a periphery side with a body 20, and this is attaching it outside the end section of the cylinder part material 16. And it is caught by the step 57 of the vibrationproofing base 3 in the direction of an axis of the cylinder part material 16, the partition film — a variation rate — the grid hole 54 of the specification-part material 17 — grid hole 54C by the side of a core, and the partition film — a variation rate — it changes from the grid holes 54A and 54B on a par with two trains to the hoop direction of the specification-part material 17. The number of four pieces and grid hole 54B of an outside train of the number of grid hole 54A of an inside train is eight. It is arranged at every respectively equal include angle (90 degrees or 45 degrees). And the location in the hoop direction of grid hole 54A of an inside train and grid hole 54B in every 90 degrees of an outside train is doubled. The configuration of a grid hole line is a configuration which divides the annular hole along said hoop direction to a radial, and changes. 19 is opening which makes 1st liquid room 11A and an orifice 25 open for free passage.

[0029]

The grid hole 54 of the grid wall 18 also changes from the grid holes 54A and 54B on a par with two trains to grid hole 54C by the side of a core, and the hoop direction of the grid wall 18, the patterns (location in the circumference of the axis O of the number, a configuration, and the grid wall 18 etc.) — the partition film — a variation rate — it is the same as the pattern by the side of the specification-part material 17, however, the grid holes 54A and 54B of the grid wall 18 — dividing — the film — a variation rate — the grid holes 54A and 54B of the specification-part material 17 carry out a location gap in a hoop direction — as — the partition film — a variation rate — the cylinder part 20 of the specification-part material 17 is attached outside the cylinder part material 16 (refer to drawing 10). The location of grid hole 54C by the side of a core is the same.

[0030]

As shown in drawing 7, drawing 8, and drawing 9, the rib group 50 protrudes on both sides of the elastic partition film 15, respectively. The pattern of the rib group 50 of one field and the pattern of the rib group 50 of the field of another side are the same. This rib group 50 consists of two or more 1st ribs 51 which can enclose them, and two or more 2nd ribs 52 distributed over the whole surface of the elastic partition film 15 two or more grid holes 54 of every.

[0031]

Two or more 1st ribs 51 are annularly formed to the axis P of the elastic partition film 15, and are constituted from a direction of a path of the grid wall 18 (or partition film a variation rate specification-part material 17) by the grid member part 53 (refer to drawing 2 and drawing 5) of the both sides of each grid hole line possible [the contact to each **]. This encloses the grid hole 54 in said each train (an inside train, outside train) of every. Moreover, the 1st rib 51 is having the height dimension set up so that the crowning T1 may separate with the grid wall 18 (or partition film a variation rate specification-part material 17) and can be located (refer to drawing 11). that is, — an attachment condition — the 1st rib 51 of one field of the elastic partition film 15 — the crowning T1 — dividing — the film — a variation rate — making [and] it estrange from the specification-part material 17, the 1st rib 51 of the field of another side is making the crowning T1 estrange from the grid wall 18

[0032]

The 2nd rib 52 is arranged to the axis P of the elastic partition film 15 at the radial. And a height dimension is set up so that the crowning T2 may always contact the grid wall 18 (or partition film a variation rate specification-part material 17). that is, it is shown in the enlarged drawing of drawing 9 — as — an attachment condition — the 2nd rib 52 of one field of the elastic partition film 15 — the crowning T2 — dividing — the film — a variation rate — the specification-part material 17 is made to contact, and the 2nd rib 52 of the field of another side is making the crowning T2 contact the grid wall 18 Furthermore, the rib width of face D1 of the 1st rib 51 and the rib width of face D2 of the 2nd rib 52 are set up so that the 2nd rib 52 may become smaller than the 1st rib 51 ($D2 < D1$). As mentioned above, two or more 1st ribs 51 and two or more 2nd ribs 52 are intermingled mutually.

[0033]

[The 2nd operation gestalt]

As shown in drawing 12 and drawing 13, the structure (in detail structure of an orifice 25) of the partition object 12, the structure of the bottom metallic ornaments 5, and the structure in 1st liquid room 11A differ from the 1st operation gestalt. Since other configurations are the same as the 1st operation gestalt, the point that the above-mentioned structures differ is explained.

[0034]

<Structure of the partition object 12>

Said orifice 25 is made into the circumference of the axis O of the cylinder part material 16 1 round, this orifice 25 — the partition film — a variation rate — it is open for free passage through opening and the notch of the specification-part material 17. And it is open for free passage to 2nd liquid room 11B through the opening 58 of the pinching member 14.

[0035]

<Structure of the bottom metallic ornaments 5>

Predetermined has carried out the include-angle inclination to the axis of the tubed metallic ornaments 4.

[0036]

<Structure in 1st liquid room 11A>

The disc-like stirring plate 60 is formed in 1st liquid room 11A, and the 1st liquid room side orifice 63 is formed between the periphery edge 61 of the stirring plate 60, and the inner skin 62 of the vibrationproofing base 3. That is, support connection of the connection section 66 of the central site of the stirring plate 60 is carried out at the end section 65 (lower limit section) of the support shaft 64 which penetrates the vibrationproofing base 3 and is connected with the 1st fixture 1. The connection section 66 bulges to the up side. And the anchoring bolt 6 by the side of the 1st fixing metal 1 is formed in the support shaft 64 at one.

[0037]

Said vibrationproofing base 3 is carrying out vulcanization adhesion at the support shaft 64, and caulking immobilization of the connection section 66 of the central site of the stirring plate 60 is carried out at the end section 65 of the support shaft 64. The inner skin 62 of the vibrationproofing base 3 which forms the interior wall of 1st liquid room 11A. The further side from the partition object 12 stands in a row in the overall diameter section of the taper side 67 of a minor diameter, and this taper side 67. A path consists of the field 68 of the shape of the fixed body, and the magnitude and the location of the stirring plate 60 are set up so that the 1st liquid room side orifice 63 may be formed between parts for the taper surface part 69 near the overall diameter section.

[0038]

[Another operation gestalt]

[1] Said rib group 50 may consist of two or more 1st ribs 51 which can enclose them, and two or more 2nd ribs 52 distributed by the field of the elastic partition film 15 every one grid hole 54. In this case, as described also in [4], the patterns of the 2nd rib 52 may be patterns other than a radial.

[0039]

[2] in the above-mentioned operation gestalt, although only the 1st rib of the elastic partition film 15 enclosed the grid hole of a predetermined number, the grid hole 54 of said predetermined number (one or more) may be surrounded with the rib of the shape of a square frame which changes to this, for example, is formed from the 1st rib and the 2nd rib. In this case, two sides beside a square frame can also be set as the 1st rib, and two sides of length can also be set as the 2nd rib.

[0040]

[3] This invention is applicable even if it is the case where said 1st rib 51 or 2nd rib 52 do not enclose the grid hole 54.

[0041]

[4] The pattern of the pattern or the 1st rib 51 of said grid hole 54, or the 2nd rib 52 is not restricted to the pattern of the above-mentioned operation gestalt.

[Brief Description of the Drawings]

[0042]

[Drawing 1] Drawing of longitudinal section of a liquid seal close type vibration isolator

[Drawing 2] The top view of cylinder part material

[Drawing 3] The vertical section front view of cylinder part material

[Drawing 4] The side elevation of cylinder part material

[Drawing 5] The top view of partition film displacement specification-part material

[Drawing 6] The front view of partition film displacement specification-part material

[Drawing 7] The top view of the elastic partition film

[Drawing 8] The A-A sectional view of drawing 7

[Drawing 9] The B-B sectional view of drawing 7

[Drawing 10] The top view of a partition object

[Drawing 11] The C-O-C sectional view of drawing 10

[Drawing 12] Drawing of longitudinal section of the liquid seal close type vibration isolator of the 2nd operation gestalt

[Drawing 13] Decomposition drawing of longitudinal section of the liquid seal close type vibration isolator of the 2nd operation gestalt

[Description of Notations]

[0043]

1 1st Fixture

2 2nd Fixture

3 Vibrationproofing Base

8 Liquid Enclosure Room

9 Diaphragm

11A The 1st liquid room

11B The 2nd liquid room

12 Partition Object

15 Elastic Partition Film

17 Grid Member

18 Grid Member

25 Orifice

50 Rib Group

51 1st Rib

52 2nd Rib

53 Grid Member Part

54A, 54B, 54C Grid hole

60 Stirring Plate

61 Periphery Edge of Stirring Plate

62 Inner Skin of Vibrationproofing Base

63 1st Liquid Room Side Orifice

64 Support Shaft

65 End Section of Support Shaft

66 Connection Section

67 Taper Side

68 Body-like Side

69 A Part for Taper Surface Part near Overall Diameter Section

D1 Rib width of face of the 1st rib

D2 Rib width of face of the 2nd rib

T1 Crowning of the 1st rib

T2 Crowning of the 2nd rib

P The axis of the elastic partition film

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TECHNICAL FIELD

[Field of the Invention]

[0001]

The vibrationproofing base which consists of the rubber-like elasticity material by which, as for this invention, these are connected with the 1st fixture and the 2nd tubed fixture, It has the diaphragm which is attached in said 2nd fixture and forms a liquid enclosure room between said vibrationproofing bases, the partition object which divides said liquid enclosure room into the 1st liquid room by the side of said vibrationproofing base, and the 2nd liquid room by the side of said diaphragm, and the orifice which makes said 1st liquid room and 2nd liquid room open for free passage.

Said partition object is related with the liquid seal close type vibration isolator which consists of the elastic partition film and the grid member of the pair which regulates the amount of displacement of said elastic partition film from the both sides.

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PRIOR ART

[Background of the Invention]

[0002]

It prepares between the engine of an automobile, and a car-body frame, and the above-mentioned liquid seal close type vibration isolator is *****. And if it originates in the irregularity of a transit road surface and vibration of the large amplitude arises, a liquid will flow between both the liquid room through an orifice, and vibration will be attenuated according to the liquid flow effectiveness. On the other hand, if vibration of tiny vibration width of face arises, a liquid will not circulate, the elastic partition film will carry out reciprocation deformation of between both the liquid room, and vibration will be attenuated.

[0003]

In this kind of liquid seal close type vibration isolator, when the elastic partition film collides with a grid member, it is easy to generate an allophone. Then, the rib of a radial was prepared in the grid member as conventionally indicated by the patent reference 1. Moreover, with a grid member, the elastic partition film can separate and it can be located now (refer to drawing 4 of the patent reference 1).

[Patent reference 1] JP,6-221368,A

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EFFECT OF THE INVENTION

[Effect of the Invention]

[0017]

According to this invention, the crowning of the 1st rib could be made to have been able to collide with a grid member side gently, and the liquid seal close type vibration isolator which can fully reduce an allophone was able to be offered.

[0018]

Said 1st rib is arranged possible [enclosure of these grids hole] for every grid hole of a predetermined number in the field of said elastic partition film. And said 2nd rib [whether it is distributed by the field of said elastic partition film, and] Or if said 1st rib and 2nd rib are arranged possible [enclosure of these grids hole] for every grid hole of a predetermined number in the field of said elastic partition film, it will set to the vibrational state of the large amplitude. When the crowning of the 1st rib contacted a grid member, the grid hole of a predetermined number and these could prevent that a liquid flowed between another grid holes, and were able to offer the liquid seal close type vibration isolator which can raise vibration-proof ability more.

[0019]

Moreover, if a stirring plate is formed in said 1st liquid interior of a room and the 1st liquid room side orifice is formed between the periphery edge of said stirring plate, and the inner skin of a vibrationproofing base, in addition to the above-mentioned effectiveness, the liquid seal close type vibration isolator which can absorb enough vibration of the large range ranging from the low frequency to high frequency can be offered.

[Translation done.]

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention]

[0004]

According to the above-mentioned conventional configuration, the collision sound at the time of the elastic partition film of what can reduce an allophone to some extent colliding with the rib of a grid member could not be avoided, and the allophone was not able to be reduced enough.

[0005]

The purpose of this invention is in the point of offering the liquid seal close type vibration isolator which can fully reduce an allophone.

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MEANS

[Means for Solving the Problem]

[0006]

In the liquid seal close type vibration isolator indicated at the beginning, as for the description of this invention, a rib group protrudes on both sides of said elastic partition film, respectively, and this rib group consists of two or more 1st ribs intermingled mutually and two or more 2nd ribs,

Said 1st rib has a height dimension set up so that the crowning may separate with said grid member and can be located.

Said 2nd rib is in the point that a height dimension is set up, and rib width of face is set up so that it may become smaller than said 1st rib so that the crowning may contact said grid member.

[0007]

[A] According to the above-mentioned configuration, two or more 1st ribs can make the crowning able to estrange from a grid member, and it can change into the condition that two or more 2nd ribs are making the crowning contact a grid member at which field (one film surface and film surface of another side) side of the elastic partition film. By this, when the elastic partition film goes to a grid member side with vibration, the 2nd rib can be resisting, and the crowning of the 1st rib can be made to collide with a grid member side gently. It is avoidable that the drag force of two or more 2nd ribs concentrates them on some elastic partition film since the 1st rib and the 2nd rib are made intermingled. Moreover, since the 2nd rib is made smaller than the 1st rib and rigidity is weakened, it is avoidable that the elastic partition film stops being able to reciprocate easily.

[0008]

In this invention, said 1st rib is arranged possible [enclosure of these grids hole] for every grid hole of a predetermined number in the field of said elastic partition film, and if said 2nd rib is distributed by the field of said elastic partition film, it can do the next operation so.

[0009]

[B] It is avoidable that the drag force of two or more 2nd ribs concentrates it on some elastic partition film since the 2nd rib is distributed by the field of a grid member. And in the vibrational state of the large amplitude, since the 1st rib encloses them for every grid hole of a predetermined number when the crowning of the 1st rib contacts a grid member, the grid hole of said predetermined number and these can avoid that a liquid flows between another grid holes, and can prevent the fall of vibration-proof ability.

[0010]

In this invention, two or more trains arrangement of said grid hole is carried out in the hoop direction of said grid member,

Said two or more 1st ribs are formed annularly, and are constituted from a direction of a path of said grid member by the grid member part of the both sides of each grid hole line possible [the contact to each **],

If said two or more 2nd ribs are arranged to the axis of said elastic partition film at the radial, they can do the next operation so.

[0011]

[C] That is, in the vibrational state of the large amplitude, when the crowning of the 1st rib contacts a grid member, two or more 1st ribs enclose those grid holes for every grid hole line, and the grid hole of the grid hole line of arbitration and this -- ***** -- it can prevent that a liquid flows between the grid holes of another grid hole line. It is avoidable that the drag force of two or more 2nd ribs concentrates it on some elastic partition film since the 2nd rib is arranged to the axis of the elastic partition film at the radial.

[0012]

In this invention said 1st rib and 2nd rib If it is arranged possible [enclosure of these grids hole] for every grid hole of a predetermined number in the field of said elastic partition film, it will set to the vibrational state of the large amplitude. Since the 1st rib and the 2nd rib enclose these grids hole for every grid hole of a predetermined number when the crowning of the 1st rib contacts a grid member, the grid hole of a predetermined number and these can avoid that a liquid flows between another grid holes, and can prevent the fall of vibration-proof ability.

[0013]

By the way, when vibration of high frequency inputs into this equipment, reciprocation deformation is carried out, and thereby, said elastic partition film absorbs the internal pressure of the 1st liquid room, and controls high dynamic spring-ization of this equipment. However, if vibration of a higher frequency region inputs, it is possible that displacement resistance of the elastic partition film increases and low dynamic spring-ization becomes inadequate. Then, in this invention, if a stirring plate is formed in said 1st liquid interior of a room and the 1st liquid room side orifice is formed between the periphery edge of said stirring plate, and the inner skin of a vibrationproofing base, the liquid which circulates the 1st liquid room side orifice can be resonated in a high-frequency region (the resonance frequency of said liquid is set as a high value), and low dynamic spring-ization of this equipment in a high-frequency region can be attained.

[0014]

In this invention, the connection section of the central site of said stirring plate can make it the configuration by which support connection is carried out at the end section of the support shaft which penetrates said vibrationproofing base and is connected with said 1st fixture.

[0015]

Said vibrationproofing base is carrying out vulcanization adhesion at said support shaft, and with the configuration by which caulking immobilization is carried out at the end section of said support shaft, the connection section of the central site of said stirring plate can control the increment in components mark, and can simplify structure.

[0016]

Moreover, the inner skin of the vibrationproofing base which forms the interior wall of said 1st liquid room So that the further side from said partition object may stand in a row in the overall diameter section of the taper side of a minor diameter, and this taper side, a path may consist of the field of the shape of the fixed body and said 1st liquid room side orifice may be formed between parts for the taper surface part near [said] the overall diameter section It can be made the configuration to which the magnitude and the location of said stirring plate are set.

[Translation done.]

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[0042]

[Drawing 1] Drawing of longitudinal section of a liquid seal close type vibration isolator

[Drawing 2] The top view of cylinder part material

[Drawing 3] The vertical section front view of cylinder part material

[Drawing 4] The side elevation of cylinder part material

[Drawing 5] The top view of partition film displacement specification-part material

[Drawing 6] The front view of partition film displacement specification-part material

[Drawing 7] The top view of the elastic partition film

[Drawing 8] The A-A sectional view of drawing 7

[Drawing 9] The B-B sectional view of drawing 7

[Drawing 10] The top view of a partition object

[Drawing 11] The C-O-C sectional view of drawing 10

[Drawing 12] Drawing of longitudinal section of the liquid seal close type vibration isolator of the 2nd operation gestalt

[Drawing 13] Decomposition drawing of longitudinal section of the liquid seal close type vibration isolator of the 2nd operation gestalt

[Translation done.]

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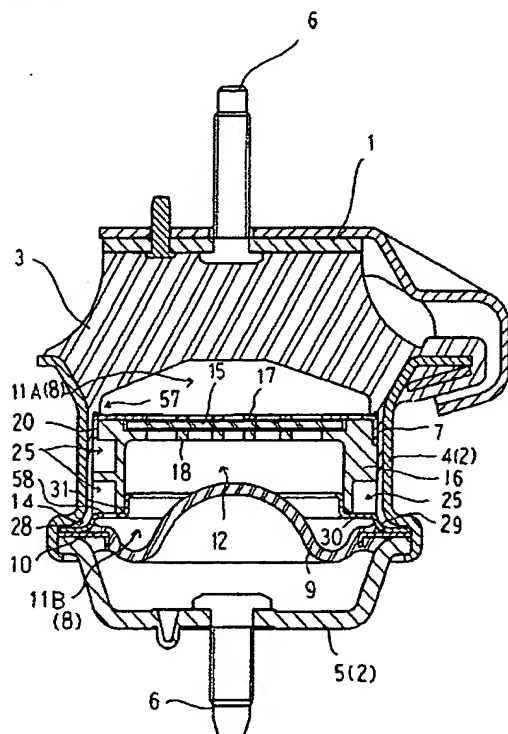
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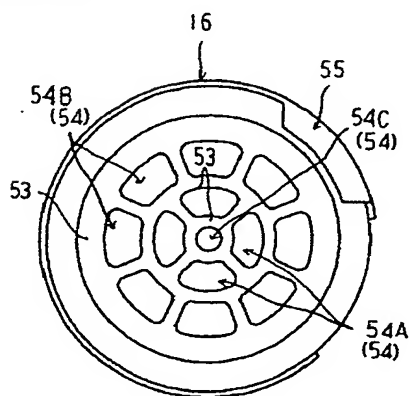
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DRAWINGS

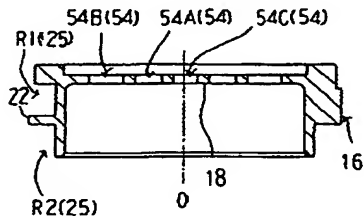
[Drawing 1]



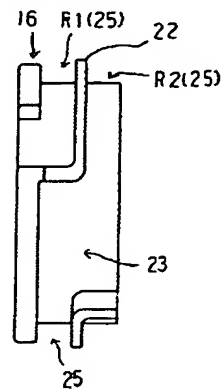
[Drawing 2]



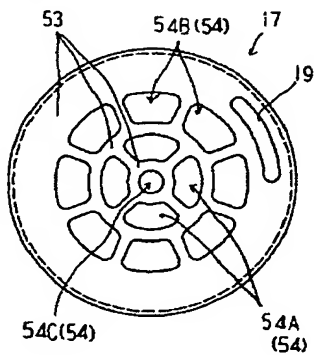
[Drawing 3]



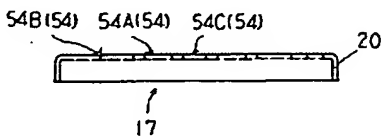
[Drawing 4]



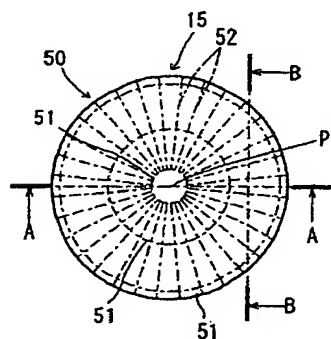
[Drawing 5]



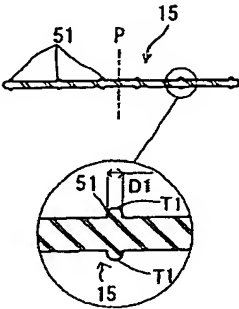
[Drawing 6]



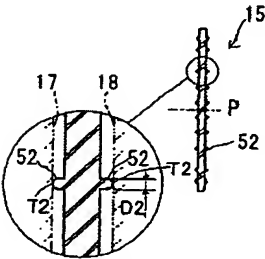
[Drawing 7]



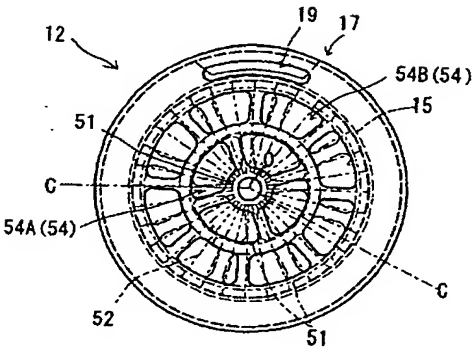
[Drawing 8]



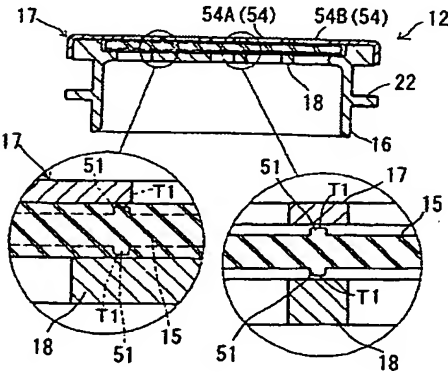
[Drawing 9]



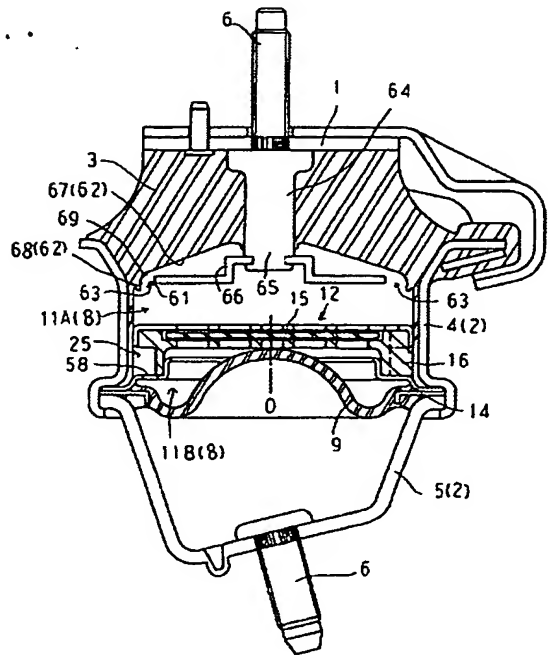
[Drawing 10]



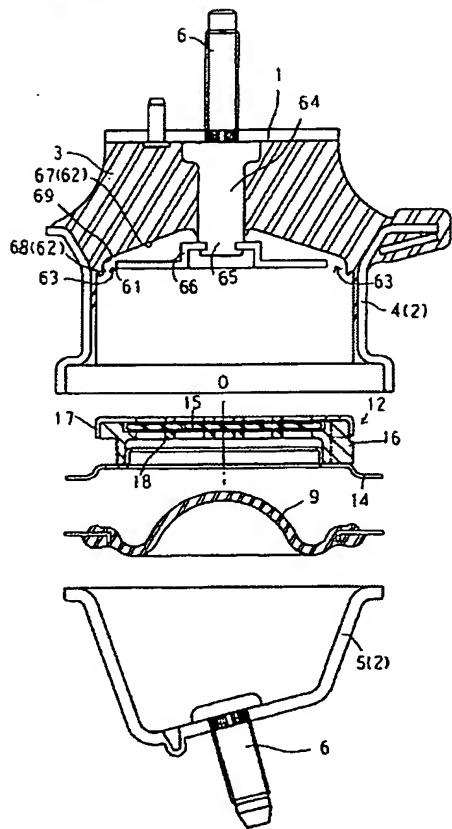
[Drawing 11]



[Drawing 12]



[Drawing 13]



[Translation done.]

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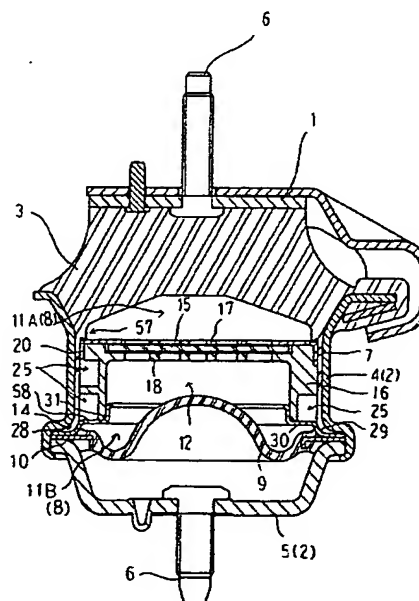
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(54) 【発明の名称】 液封入式防振装置

(57) 【要約】

【課題】 異音を十分に低減できる液封入式防振装置を提供する。

【解決手段】 第1取付け具1と第2取付け具2と防振基体3とダイヤフラム9と仕切り体12とオリフィス25とを備え、仕切り体12は、弾性仕切り膜15と、一対の格子部材17、18とから成り、弾性仕切り膜15の両面にリブ群50がそれぞれ突設され、このリブ群50は、互いに混在した複数の第1リブ51と複数の第2リブ52とから成り、第1リブ51は、その頂部が格子部材17、18と離れて位置することができるように高さ寸法を設定され、第2リブ52は、その頂部が格子部材17、18に当接するように高さ寸法を設定され、かつ、第1リブ51よりも小幅になるようにリブ幅が設定されている。



【特許請求の範囲】

【請求項 1】

第 1 取付け具と、筒状の第 2 取付け具と、これらを連結するゴム状弾性材から成る防振基体と、前記第 2 取付け具に取付けられて前記防振基体との間に液体封入室を形成するダイヤフラムと、前記液体封入室を前記防振基体側の第 1 液室と前記ダイヤフラム側の第 2 液室に仕切る仕切り体と、前記第 1 液室と第 2 液室を連通させるオリフィスとを備え、

前記仕切り体は、弾性仕切り膜と、前記弾性仕切り膜の変位量をその両側から規制する一対の格子部材とから成る液封入式防振装置であって、

前記弾性仕切り膜の両面にリブ群がそれぞれ突設され、このリブ群は、互いに混在した複数の第 1 リブと複数の第 2 リブとから成り、

前記第 1 リブは、その頂部が前記格子部材と離れて位置することができるように高さ寸法を設定され、

前記第 2 リブは、その頂部が前記格子部材に当接するように高さ寸法を設定され、かつ、前記第 1 リブよりも小幅になるようにリブ幅が設定されている液封入式防振装置。

【請求項 2】

前記第 1 リブは、所定数の格子孔ごとにそれら格子孔を取り囲み可能に前記弾性仕切り膜の面に配置され、前記第 2 リブは、前記弾性仕切り膜の面に分散配置されている請求項 1 記載の液封入式防振装置。

【請求項 3】

前記格子孔は、前記格子部材の周方向に複数列配置され、

前記複数の第 1 リブは環状に形成されて、前記格子部材の径方向で各格子孔列の両側の格子部材部分に各別に当接可能に構成され、

前記複数の第 2 リブは前記弾性仕切り膜の軸芯に対して放射状に配置されている請求項 2 記載の液封入式防振装置。

【請求項 4】

前記第 1 リブ及び第 2 リブは、所定数の格子孔ごとにそれら格子孔を取り囲み可能に前記弾性仕切り膜の面に配置されている請求項 1 記載の液封入式防振装置。

【請求項 5】

前記第 1 液室内に投拌板が設けられて、前記投拌板の外周縁と防振基体の内周面との間に第 1 液室側オリフィスが形成されている請求項 1～4 のいずれか一つに記載の液封入式防振装置。

【請求項 6】

前記防振基体を貫通して前記第 1 取付け具に連結される支持軸の一端部に前記投拌板の中央側の連結部が支持連結されている請求項 5 記載の液封入式防振装置。

【請求項 7】

前記防振基体は前記支持軸に加硫接着しており、前記

投拌板の中央側の連結部は前記支持軸の一端部にかしめ固定されている請求項 6 記載の液封入式防振装置。

【請求項 8】

前記第 1 液室の室壁を形成する防振基体の内周面は、前記仕切り体から遠い側ほど小径のテーパ面と、このテーパ面の最大径部に連なり、径が一定の直胴状の面とから成り、前記最大径部付近のテーパ面部分との間に前記第 1 液室側オリフィスが形成されるように、前記投拌板の大きさ及び位置が設定されている請求項 5～7 のいずれか一つに記載の液封入式防振装置。

【発明の詳細な説明】

【技術分野】

【0001】

本発明は、第 1 取付け具と、筒状の第 2 取付け具と、これらを連結するゴム状弾性材から成る防振基体と、前記第 2 取付け具に取付けられて前記防振基体との間に液体封入室を形成するダイヤフラムと、前記液体封入室を前記防振基体側の第 1 液室と前記ダイヤフラム側の第 2 液室に仕切る仕切り体と、前記第 1 液室と第 2 液室を連通させるオリフィスとを備え、

前記仕切り体は、弾性仕切り膜と、前記弾性仕切り膜の変位量をその両側から規制する一対の格子部材とから成る液封入式防振装置に関する。

【背景技術】

【0002】

上記の液封入式防振装置は、例えば、自動車のエンジンと車体フレームとの間に設けられている。そして、走行路面の凹凸に起因して、大振幅の振動が生じると、液体がオリフィスを通して両液室間を流動し、その液体流動効果によって振動を減衰させる。一方、微振幅の振動が生じると、両液室間を液体が流通することはなく、弾性仕切り膜が往復動変形して振動を減衰させる。

【0003】

この種の液封入式防振装置では、弾性仕切り膜が格子部材に衝突したときに異音が発生しやすい。そこで、従来、特許文献 1 に開示されているように、格子部材に放射状のリブが設けられていた。また弾性仕切り膜は、格子部材とは離れて位置することができるようになっていた（特許文献 1 の図 4 参照）。

【特許文献 1】特開平 6-221368 号公報

【発明の開示】

【発明が解決しようとする課題】

【0004】

上記従来の構成によれば、ある程度異音を低減することができるものの、弾性仕切り膜が格子部材のリブと衝突する際の衝突音を避けることができず、異音を十分低減できてはいなかった。

【0005】

本発明の目的は、異音を十分に低減することができる液封入式防振装置を提供する点にある。

【課題を解決するための手段】

【0006】

本発明の特徴は、冒頭に記載した液封入式防振装置において、前記弾性仕切り膜の両面にリブ群がそれぞれ突設され、このリブ群は、互いに混在した複数の第1リブと複数の第2リブとから成り、

前記第1リブは、その頂部が前記格子部材と離れて位置することができるように高さ寸法を設定され、

前記第2リブは、その頂部が前記格子部材に当接するように高さ寸法を設定され、かつ、前記第1リブよりも小幅になるようにリブ幅が設定されている点にある。

【0007】

【A】上記の構成によれば、複数の第1リブがその頂部を格子部材から離間させ、弾性仕切り膜のいずれの面（一方の膜面と他方の膜面）の側においても、複数の第2リブがその頂部を格子部材に当接させている状態にすることができる。これにより、振動に伴って弾性仕切り膜が格子部材側に向かう場合に第2リブが抵抗になって、第1リブの頂部を格子部材面に緩やかに衝突させることができる。第1リブと第2リブは混在させてあるから、複数の第2リブの抵抗力が弾性仕切り膜の一部分に集中するのを回避できる。また、第2リブは第1リブよりも小幅にして剛性を弱くしてあるから、弾性仕切り膜が往復動しにくくなるのを回避することができる。

【0008】

本発明において、前記第1リブは、所定数の格子孔ごとにそれら格子孔を取り囲み可能に前記弾性仕切り膜の面に配置され、前記第2リブは、前記弾性仕切り膜の面に分散配置されていると、次の作用を奏することができる。

【0009】

【B】第2リブは格子部材の面に分散配置されているから、複数の第2リブの抵抗力が弾性仕切り膜の一部分に集中するのを回避できる。そして、大振幅の振動状態においては、第1リブの頂部が格子部材に当接したときに、第1リブが所定数の格子孔ごとにそれらを取り囲むから、前記所定数の格子孔と、これらとは別の格子孔との間で液体が流動するのを回避でき、防振性能の低下を防止することができる。

【0010】

本発明において、前記格子孔は、前記格子部材の周方向に複数列配置され、

前記複数の第1リブは環状に形成されて、前記格子部材の径方向で各格子孔列の両側の格子部材部分に各別に当接可能に構成され、

前記複数の第2リブは前記弾性仕切り膜の軸芯に対して放射状に配置されていると、次の作用を奏することができる。

【0011】

【C】つまり、大振幅の振動状態においては、第1リ

ブの頂部が格子部材に当接したときに、複数の第1リブが各格子孔列ごとにそれらの格子孔を取り囲む。そして、任意の格子孔列の格子孔と、これに隣合う別の格子孔列の格子孔との間で液体が流動するのを防止することができる。第2リブは弾性仕切り膜の軸芯に対して放射状に配置されているから、複数の第2リブの抵抗力が弾性仕切り膜の一部分に集中するのを回避できる。

【0012】

本発明において、前記第1リブ及び第2リブは、所定数の格子孔ごとにそれら格子孔を取り囲み可能に前記弾性仕切り膜の面に配置されていると、大振幅の振動状態においては、第1リブの頂部が格子部材に当接したときに、第1リブと第2リブが所定数の格子孔ごとにそれら格子孔を取り囲むから、所定数の格子孔と、これらとは別の格子孔との間で液体が流動するのを回避でき、防振性能の低下を防止することができる。

【0013】

ところで、本装置に高周波数の振動が入力した場合、前記弾性仕切り膜が往復動変形し、これにより、第1液室の内圧を吸収して本装置の高動ばね化を抑制する。しかしながら、より高い周波数域の振動が入力すると、弾性仕切り膜の変位抵抗が増大して、低動ばね化が不十分になることが考えられる。そこで本発明において、前記第1液室内に攪拌板が設けられて、前記攪拌板の外周縁と防振基体の内周面との間に第1液室側オリフィスが形成されていると、第1液室側オリフィスを流通する液体を高周波数域で共振させることができ（前記液体の共振周波数を高い値に設定する）、高周波数域での本装置の低動ばね化を図ることができる。

30 【0014】

本発明においては、前記防振基体を貫通して前記第1取付け具に連結される支持軸の一端部に前記攪拌板の中央側の連結部が支持連結されている構成にすることができる。

【0015】

前記防振基体が前記支持軸に加硫接着しており、前記攪拌板の中央側の連結部が前記支持軸の一端部にかしめ固定されている構成では、部品点数の増加を抑制して構造を簡素化することができる。

40 【0016】

また、前記第1液室の室壁を形成する防振基体の内周面は、前記仕切り体から遠い側ほど小径のテーパ面と、このテーパ面の最大径部に連なり、径が一定の直胴状の面とから成り、前記最大径部付近のテーパ面部分との間に前記第1液室側オリフィスが形成されるように、前記攪拌板の大きさ及び位置が設定されている構成にすることができる。

【発明の効果】

【0017】

本発明によれば、第1リブの頂部を格子部材面に緩や

かに衝突させることができ、異音を十分に低減させることができる液封入式防振装置を提供することができた。

【0018】

そして、前記第1リブが、所定数の格子孔ごとにそれら格子孔を取り囲み可能に前記弾性仕切り膜の面に配置され、前記第2リブは、前記弾性仕切り膜の面に分散配置されているか、あるいは、前記第1リブ及び第2リブが、所定数の格子孔ごとにそれら格子孔を取り囲み可能に前記弾性仕切り膜の面に配置されていると、大振幅の振動状態においては、第1リブの頂部が格子部材に当接したときに、所定数の格子孔と、これらとは別の格子孔との間で液体が流動するのを防止することができ、防振性能をより向上させることができる液封入式防振装置を提供することができた。

【0019】

また、前記第1液室内に攪拌板が設けられて、前記攪拌板の外周縁と防振基体の内周面との間に第1液室側オリフィスが形成されていると、上記の効果に加えて、低周波数から高周波数にわたる広い範囲の振動を十分吸収することができる液封入式防振装置を提供することができる。

【発明を実施するための最良の形態】

【0020】

【第1実施形態】

以下、本発明の実施の形態を図面に基づいて説明する。図1に液封入式防振装置を示してある。この防振装置は、自動車のエンジンに取付けられる第1取付け金具1と、エンジンの下方の車体フレームに取付けられる筒状の第2取付け金具2と、これらを連結するゴム状弾性材から成る防振基体3とを備えている。

【0021】

第1取付け金具1は板状に形成され、上向きの取付けボルト6を備えている。第2取付け金具2は、防振基体3が加硫成形される筒状金具4と、カップ状の底金具5とから成り、底金具5の中央部に下向きの取付けボルト6が突設されている。

【0022】

防振基体3は円錐台形状に形成されている。そして、その上端面が第1取付け金具1に、下端部が、筒状金具4の上広がり状の上端開口部にそれぞれ加硫接着している。この防振基体3の下面部に上窄まりの中空部が形成され、防振基体3の下端部に、筒状金具4の内周面を覆うゴム膜7が連なっている。

【0023】

第2取付け金具2に、防振基体3の下面との間に液体封入室8を形成するゴム膜から成る部分球状のダイヤフラム9が取付けられ、液体封入室8に液体が封入されている。ダイヤフラム9は底金具5に覆われている。

【0024】

図10、図11にも示すように、液体封入室8を防振基体3側の第1液室11Aとダイヤフラム側の第2液室11Bに仕切る仕切り体12が設けられている。仕切り体12は、第2取付け金具2の内周部側に設けた挟持部材14と防振基体3とにより挟持固定されている。

【0025】

詳しくは、仕切り体12は、ゴム膜から成る円板状の弾性仕切り膜15と、この弾性仕切り膜15を収容して内周面間の格子壁18（格子部材に相当）で受止める筒部材16と、この筒部材16の一端部側の開口を覆う格子円板状の仕切り膜変位規制部材17（格子部材に相当）とから成る。つまり、格子壁18と仕切り膜変位規制部材17とが弾性仕切り膜15の変位量をその膜15の両側から規制している。

【0026】

前記第1液室11Aと第2液室11B同士を連通させるオリフィス25を、筒部材16の外周面と第2取付け金具2の内周面との間に形成してある。図2、図3、図4に示すように、オリフィス流路は筒部材16の軸芯O周りに2周している。すなわち、上側の1周分のオリフィス流路R1と、下側の1周分のオリフィス流路R2とから成る。22はオリフィス形成壁である。上側のオリフィス流路R1は、仕切り膜変位規制部材17の開口19（図5参照）と切欠き55を介して連通している。下側のオリフィス流路R2は、挟持部材14の開口58を介して第2液室11Bと連通している（図1参照）。

【0027】

図1に示すように挟持部材14は、外周部側平板部28と、ゴム膜7の下端部に内嵌する第1筒部29と、筒部材16の他端部に押圧作用する中間部側平板部30と、筒部材16の他端部24側の開口部に内嵌する第2筒部31とから成る。外周部側平板部28は、ダイヤフラム9の取付け板10・筒状金具4・底金具5と共にかしめ固定されている。

【0028】

図5、図6に示すように、仕切り膜変位規制部材17は外周側に円筒部20を備え、これが筒部材16の一端部に外嵌している。そして防振基体3の段部57に筒部材16の軸芯方向で受止められている。仕切り膜変位規制部材17の格子孔54は、中心側の格子孔54Cと、仕切り膜変位規制部材17の周方向に2列に並ぶ格子孔54A、54Bとから成る。内側の列の格子孔54Aの数は4個、外側の列の格子孔54Bの数は8個である。それぞれ均等な角度（90度又は45度）ごとに配置されている。そして、内側の列の格子孔54Aと、外側の列の90度ごとの格子孔54Bとの周方向における位置を合わせてある。格子孔列の形状は、前記周方向に沿う環状の孔を放射状に分断して成る形状である。19は第1液室11Aとオリフィス25を連通させる開口である。

【0029】

格子壁18の格子孔54も、中心側の格子孔54Cと、格子壁18の周方向に2列に並ぶ格子孔54A、54Bとから成る。そのパターン（個数・形状・格子壁18の軸芯O周りでの位置等）は仕切り膜変位規制部材17側のパターンと同じである。ただし、格子壁18の格子孔54A、54Bと仕切り膜変位規制部材17の格子孔54A、54Bとが周方向で位置ずれするように、仕切り膜変位規制部材17の筒部20を筒部材16に外嵌してある（図10参照）。中心側の格子孔54C同士

【0030】

図7、図8、図9に示すように、弾性仕切り膜15の両面にリブ群50がそれぞれ突設されている。一方の面のリブ群50のパターンと、他方の面のリブ群50のパターンとは同一である。このリブ群50は、複数の格子孔54ごとにそれらを取り囲み可能な複数の第1リブ51と、弾性仕切り膜15の全面にわたって分散配置された複数の第2リブ52とから成る。

【0031】

複数の第1リブ51は、弾性仕切り膜15の軸芯Pに対して環状に形成され、格子壁18（又は仕切り膜変位規制部材17）の径方向で各格子孔列の両側の格子部材部分53（図2、図5参照）に各別に当接可能に構成されている。これにより前記各列（内側の列、外側の列）ごとに格子孔54を取り囲む。また、第1リブ51は、その頂部T1が格子壁18（又は仕切り膜変位規制部材17）と離れて位置することができるように高さ寸法を設定されている（図11参照）。つまり、組付け状態では、弾性仕切り膜15の一方の面の第1リブ51は、その頂部T1を仕切り膜変位規制部材17から離間させ、かつ、他方の面の第1リブ51は、その頂部T1を格子壁18から離間させている。

【0032】

第2リブ52は弾性仕切り膜15の軸芯Pに対して放射状に配置されている。そして、その頂部T2が格子壁18（又は仕切り膜変位規制部材17）に常に当接するように高さ寸法を設定されている。つまり図9の拡大図に示すように、組付け状態では弾性仕切り膜15の一方の面の第2リブ52が、その頂部T2を仕切り膜変位規制部材17に当接させ、かつ、他方の面の第2リブ52が、その頂部T2を格子壁18に当接させている。さらに、第2リブ52が第1リブ51よりも小幅になるように、第1リブ51のリブ幅D1と第2リブ52のリブ幅D2とが設定されている（ $D2 < D1$ ）。上記のように、複数の第1リブ51と複数の第2リブ52とは互いに混在している。

【0033】

【第2実施形態】

図12、図13に示すように、第1実施形態と異なっ

ているのは、仕切り体12の構造（詳しくはオリフィス25の構造）と、底金具5の構造と、第1液室11A内の構造である。その他の構成は第1実施形態と同じであるので、上記の構造の異なる点について説明する。

【0034】

＜仕切り体12の構造＞

前記オリフィス25は筒部材16の軸芯O周りに1周している。このオリフィス25は、仕切り膜変位規制部材17の開口と切欠きを介して連通している。そして、挟持部材14の開口58を介して第2液室11Bに連通している。

【0035】

＜底金具5の構造＞

筒状金具4の軸芯に対して所定の角度傾斜させてある。

【0036】

＜第1液室11A内の構造＞

第1液室11A内に円板状の攪拌板60が設けられて、攪拌板60の外周縁61と防振基体3の内周面62との間に第1液室側オリフィス63が形成されている。すなわち、防振基体3を貫通して第1取付け具1に連結される支持軸64の一端部65（下端部）に攪拌板60の中央側の連結部66が支持連結されている。連結部66は上側に膨出している。そして、第1取付け金具1側の取付けボルト6は支持軸64に一体に形成されている。

【0037】

前記防振基体3は支持軸64に加硫接着しており、攪拌板60の中央側の連結部66は支持軸64の一端部65にかしめ固定されている。第1液室11Aの室壁を形成する防振基体3の内周面62は、仕切り体12から遠い側ほど小径のテーパ面67と、このテーパ面67の最大径部に連なり、径が一定の直胴状の面68とから成り、最大径部付近のテーパ面部分69との間に第1液室側オリフィス63が形成されるように、攪拌板60の大きさ及び位置が設定されている。

【0038】

【別実施形態】

【1】前記リブ群50は、1個の格子孔54ごとにそれらを取り囲み可能な複数の第1リブ51と、弾性仕切り膜15の面に分散配置された複数の第2リブ52とから成っていてもよい。この場合、【4】でも述べるように、第2リブ52のパターンは放射状以外のパターンであってもよい。

【0039】

【2】上記の実施形態では、所定数の格子孔を取り囲むのは弾性仕切り膜15の第1リブだけであったが、これに換えて、例えば、第1リブと第2リブから形成される四角枠状のリブで前記所定数（1個あるいは複数個）の格子孔54を取り囲むようにしてあってもよい。この

場合、四角枠の横の2辺を第1リブに、縦の2辺を第2リブに設定することもできる。

【0040】

〔3〕前記第1リブ51や第2リブ52が格子孔54を取り囲まない場合であっても、本発明は適用することができる。

【0041】

〔4〕前記格子孔54のパターンや第1リブ51や第2リブ52のパターンは上記の実施形態のパターンに限られるものではない。

【図面の簡単な説明】

【0042】

【図1】液封入式防振装置の縦断面図

【図2】筒部材の平面図

【図3】筒部材の縦断正面図

【図4】筒部材の側面図

【図5】仕切り膜変位規制部材の平面図

【図6】仕切り膜変位規制部材の正面図

【図7】弾性仕切り膜の平面図

【図8】図7のA-A断面図

【図9】図7のB-B断面図

【図10】仕切り体の平面図

【図11】図10のC-C断面図

【図12】第2実施形態の液封入式防振装置の縦断面図

【図13】第2実施形態の液封入式防振装置の分解縦断面図

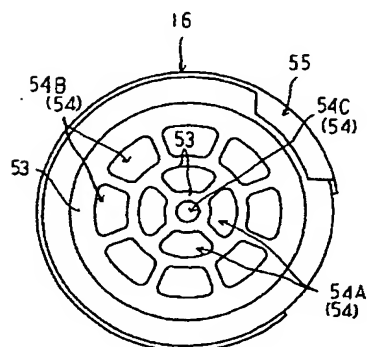
【符号の説明】

【0043】

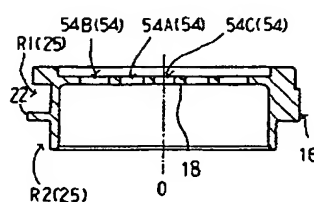
- | | |
|---|--------|
| 1 | 第1取付け具 |
| 2 | 第2取付け具 |

- | | | |
|---------------|---------------|-----------|
| 3 | 防振基体 | |
| 8 | 液体封入室 | |
| 9 | ダイヤフラム | |
| 11A | 第1液室 | |
| 11B | 第2液室 | |
| 12 | 仕切り体 | |
| 15 | 弾性仕切り膜 | |
| 17 | 格子部材 | |
| 18 | 格子部材 | |
| 10 | 25 | オリフィス |
| 50 | リブ群 | |
| 51 | 第1リブ | |
| 52 | 第2リブ | |
| 53 | 格子部材部分 | |
| 54A, 54B, 54C | 格子孔 | |
| 60 | 攪拌板 | |
| 61 | 攪拌板の外周縁 | |
| 62 | 防振基体の内周面 | |
| 63 | 第1液室側オリフィス | |
| 20 | 64 | 支持軸 |
| 65 | 支持軸の一端部 | |
| 66 | 連結部 | |
| 67 | テーパ面 | |
| 68 | 直胴状の面 | |
| 69 | 最大径部付近のテーパ面部分 | |
| D1 | 第1リブのリブ幅 | |
| D2 | 第2リブのリブ幅 | |
| T1 | 第1リブの頂部 | |
| T2 | 第2リブの頂部 | |
| 30 | P | 弾性仕切り膜の軸芯 |

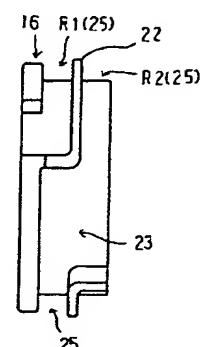
【図2】



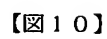
【図3】



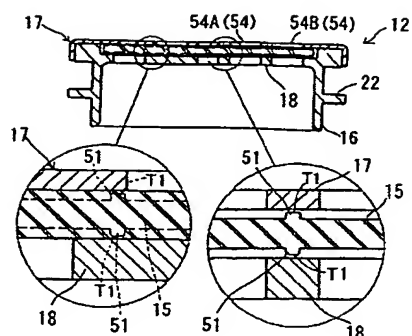
【図4】



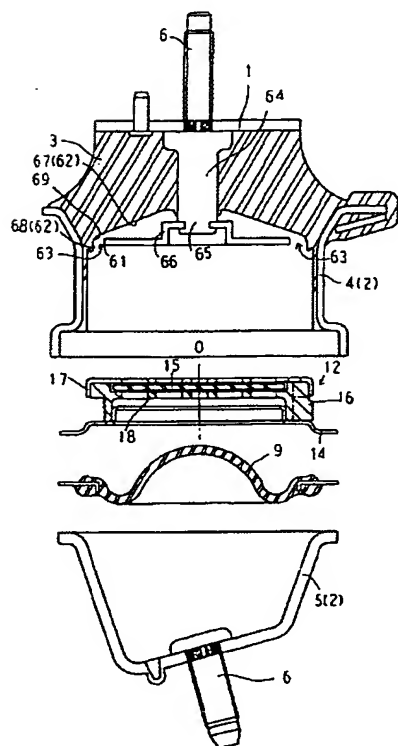
【図 1】



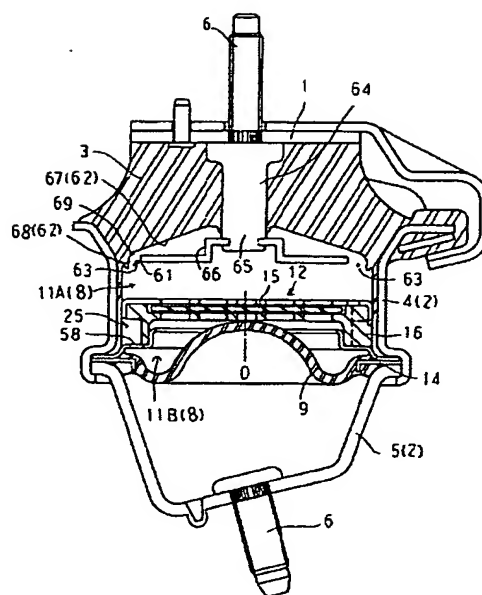
【図 11】



【図 13】



【図 12】



【手続補正書】

【提出日】平成16年4月5日(2004.4.5)

【手続補正1】

【補正対象書類名】特許請求の範囲

【補正対象項目名】全文

【補正方法】変更

【補正の内容】

【特許請求の範囲】

【請求項1】

第1取付け具と、筒状の第2取付け具と、これらを連結するゴム状弾性材から成る防振基体と、前記第2取付け具に取付けられて前記防振基体との間に液体封入室を形成するダイヤフラムと、前記液体封入室を前記防振基

体側の第1液室と前記ダイヤフラム側の第2液室に仕切る仕切り体と、前記第1液室と第2液室を連通させるオリフィスとを備え、

前記仕切り体は、弾性仕切り膜と、前記弾性仕切り膜の変位量をその両側から規制する一対の格子部材とから成る液封入式防振装置であって、

前記弾性仕切り膜の両面にリブ群がそれぞれ突設され、このリブ群は、互いに混在した複数の第1リブと複数の第2リブとから成り、

前記第1リブは、その頂部が前記格子部材と離れて位置することができるように高さ寸法を設定され、

前記第2リブは、その頂部が前記格子部材に当接するように高さ寸法を設定され、かつ、前記第1リブよりも小幅になるようにリブ幅が設定されている液封入式防振装置。

【請求項2】

前記第1リブは、前記格子部材の1個又は複数個の格子孔ごとにそれら格子孔を取り囲み可能に前記弾性仕切り膜の面に配置され、前記第2リブは、前記弾性仕切り膜の面に分散配置されている請求項1記載の液封入式防振装置。

【請求項3】

前記格子孔は、前記格子部材の周方向に複数列配置され、

前記複数の第1リブは環状に形成されて、前記格子部材の径方向で各格子孔列の両側の格子部材部分に各別に当接可能に構成され、

前記複数の第2リブは前記弾性仕切り膜の軸芯に対して放射状に配置されている請求項2記載の液封入式防振装置。

【請求項4】

前記第1リブ及び第2リブは、前記格子部材の1個又は複数個の格子孔ごとにそれら格子孔を取り囲み可能に前記弾性仕切り膜の面に配置されている請求項1記載の液封入式防振装置。

【請求項5】

前記第1液室内に攪拌板が設けられて、前記攪拌板の外周縁と防振基体の内周面との間に第1液室側オリフィスが形成されている請求項1～4のいずれか一つに記載の液封入式防振装置。

【請求項6】

前記防振基体を貫通して前記第1取付け具に連結される支持軸の一端部に前記攪拌板の中央側の連結部が支持連結されている請求項5記載の液封入式防振装置。

【請求項7】

前記防振基体は前記支持軸に加硫接着しており、前記攪拌板の中央側の連結部は前記支持軸の一端部にかしめ固定されている請求項6記載の液封入式防振装置。

【請求項8】

前記第1液室の室壁を形成する防振基体の内周面は、前記仕切り体から遠い側ほど小径のテーパ面と、このテーパ面の最大径部に連なり、径が一定の直胴状の面とから成り、前記最大径部付近のテーパ面部分との間に前記第1液室側オリフィスが形成されるように、前記攪拌板の大きさ及び位置が設定されている請求項5～7のいずれか一つに記載の液封入式防振装置。

【手続補正2】

【補正対象書類名】明細書

【補正対象項目名】0008

【補正方法】変更

【補正の内容】

【0008】

本発明において、前記第1リブは、前記格子部材の1個又は複数個の格子孔ごとにそれら格子孔を取り囲み可能に前記弾性仕切り膜の面に配置され、前記第2リブは、前記弾性仕切り膜の面に分散配置されていると、次の作用を奏することができる。

【手続補正3】

【補正対象書類名】明細書

【補正対象項目名】0012

【補正方法】変更

【補正の内容】

【0012】

本発明において、前記第1リブ及び第2リブは、前記格子部材の1個又は複数個の格子孔ごとにそれら格子孔を取り囲み可能に前記弾性仕切り膜の面に配置されていると、大振幅の振動状態においては、第1リブの頂部が格子部材に当接したときに、第1リブと第2リブが所定数の格子孔ごとにそれら格子孔を取り囲むから、所定数の格子孔と、これらとは別の格子孔との間で液体が流動するのを回避でき、防振性能の低下を防止することができる。

フロントページの続き

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